

Figure 1 Rheology of Fibril Based Inks ("n1" and "n2": Shear thinning index; the higher the better)

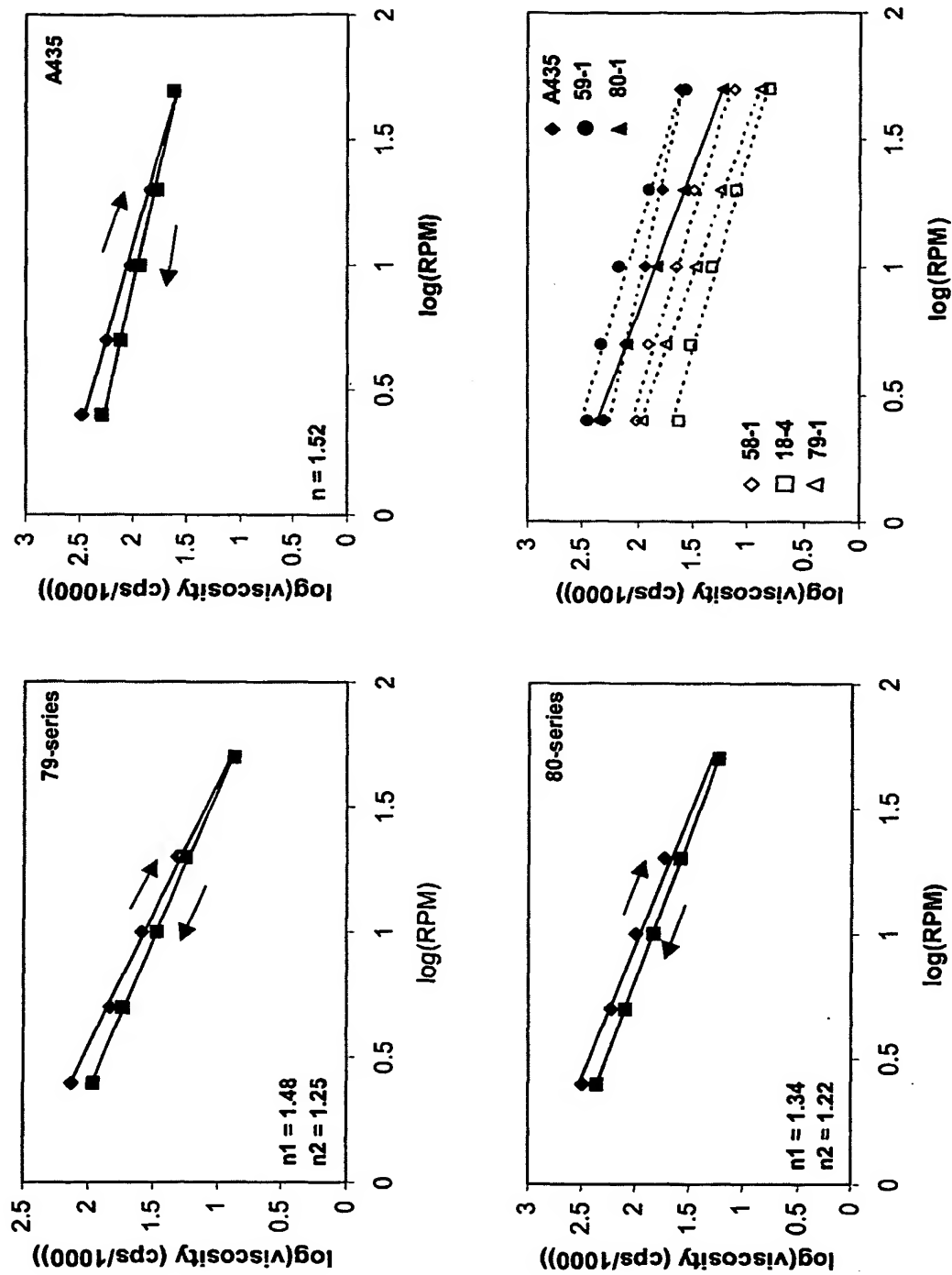
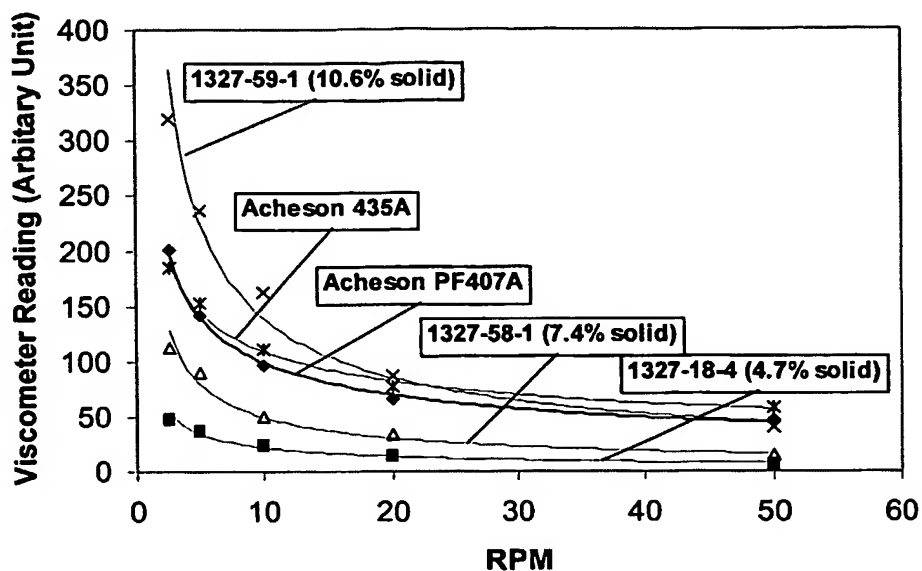
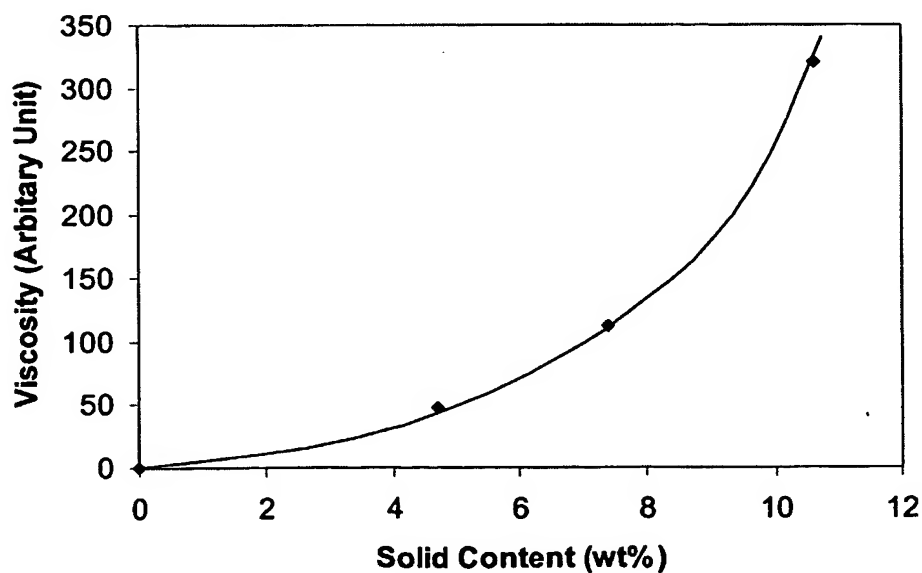


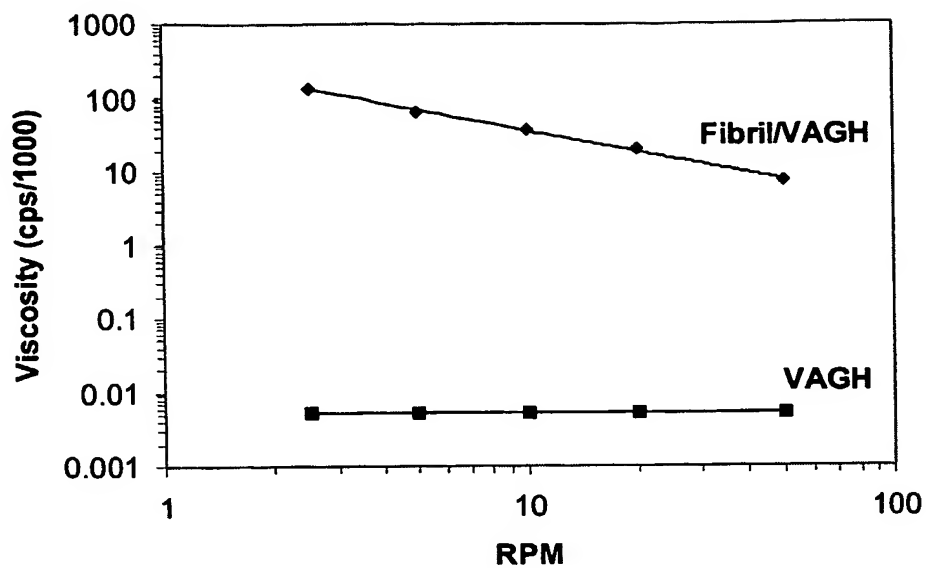
Figure 2 Relative viscosity vs shear (Brookfield spindle speed)



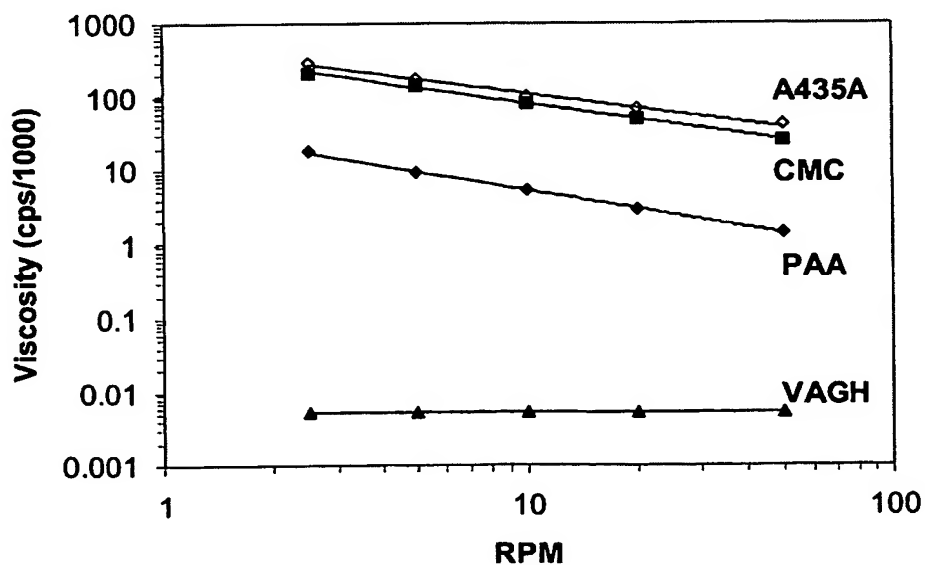
(a) Comparison of commercial (Acheson) and fibril based inks



(b) Relative viscosity vs total solid content for 1:2 fibrils to binder

Figure 3 Binder viscosity

(a) Viscosity profile from VAGH binder alone and at the same level in fibril ink



(b) Binder (3%, no fibrils) viscosity in comparison with Acheson A435A ink

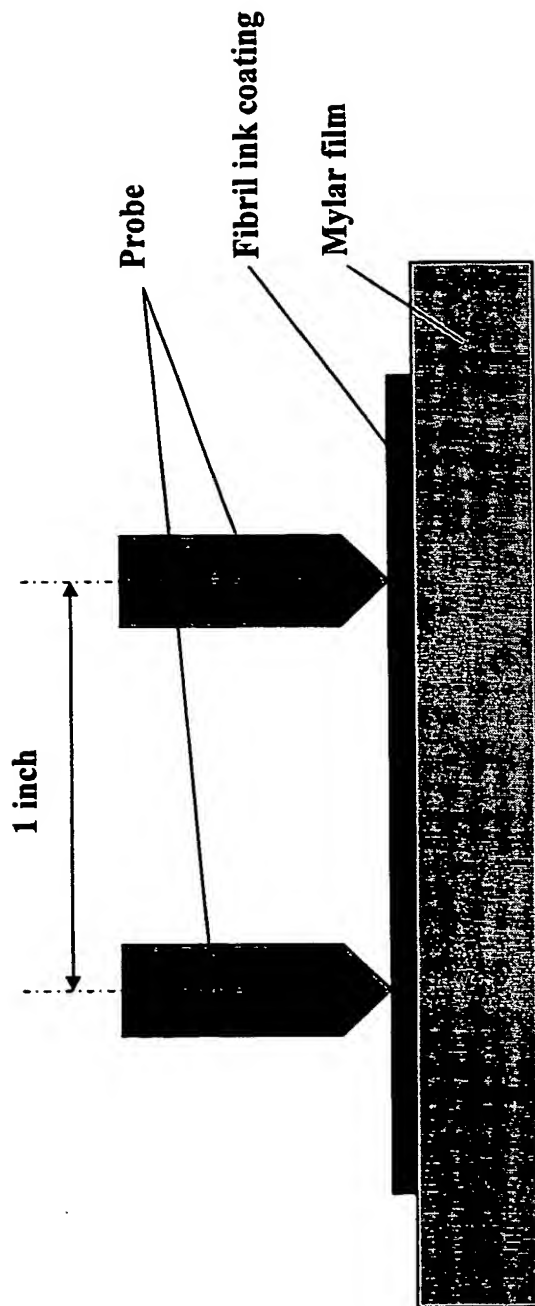


Figure 4 Two-point probe for measuring coating surface resistivity

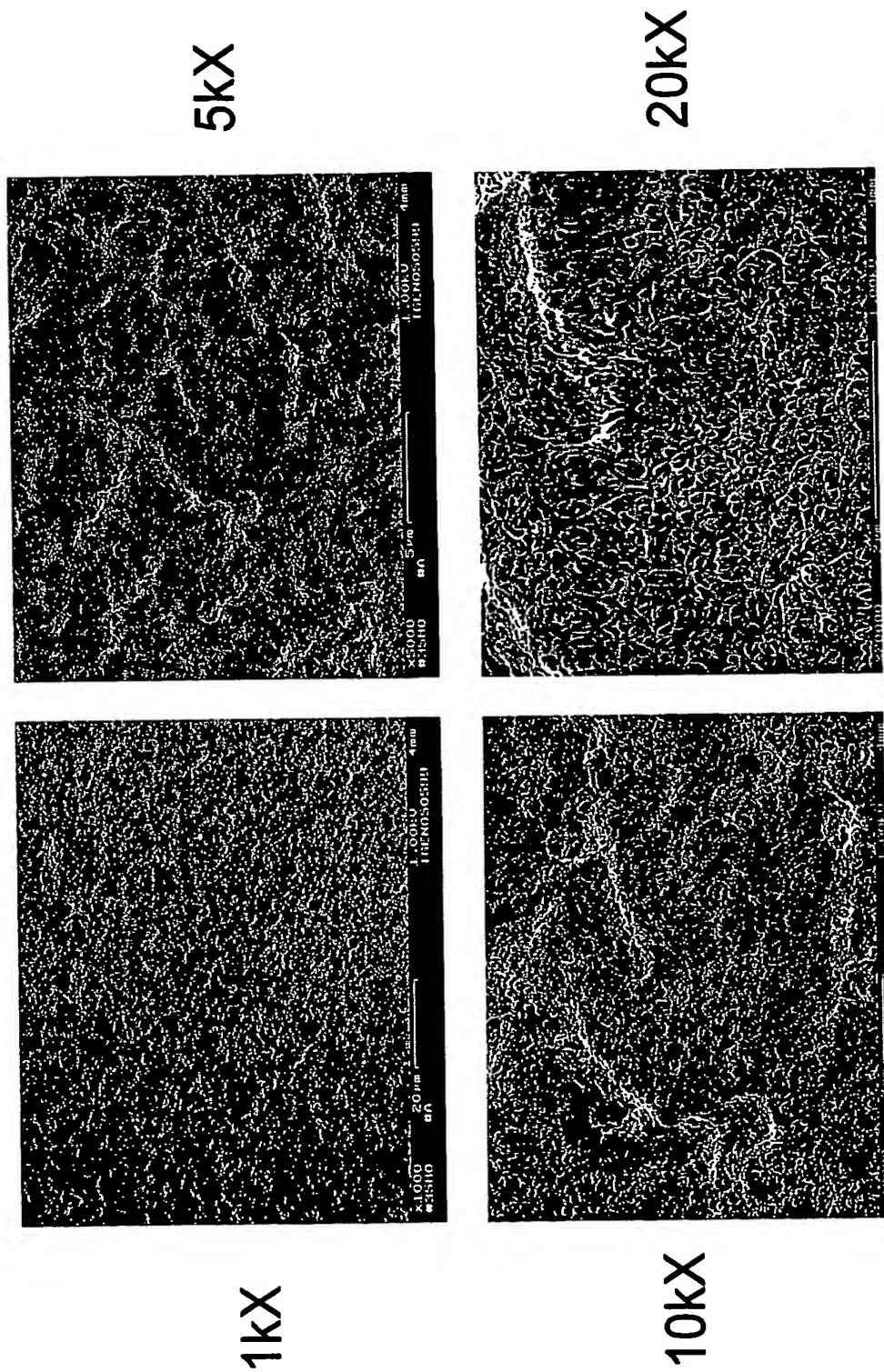


Figure 5 SEM images of 200-mesh screen-printed line made with fibril based ink (#1327-54-1).

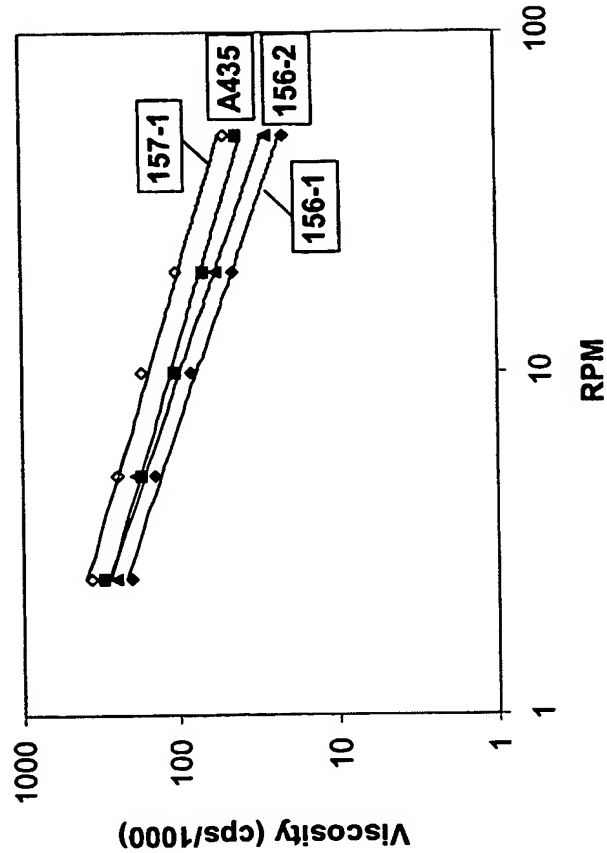
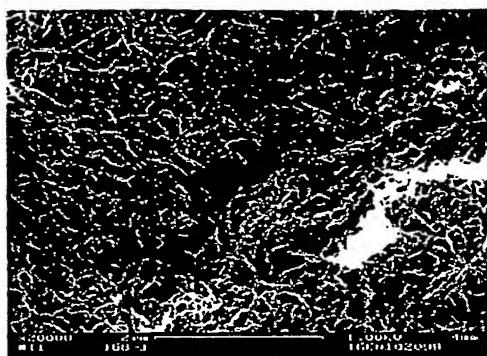
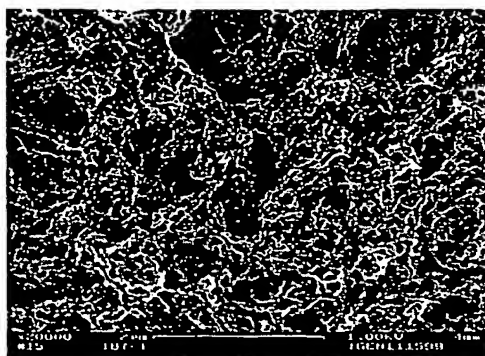


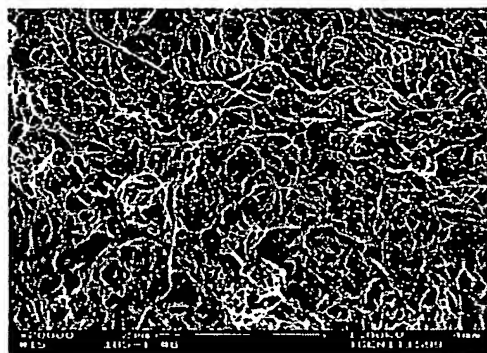
Figure 6 Viscosity profile of fibril inks with CAB binder versus commercially available carbon inks



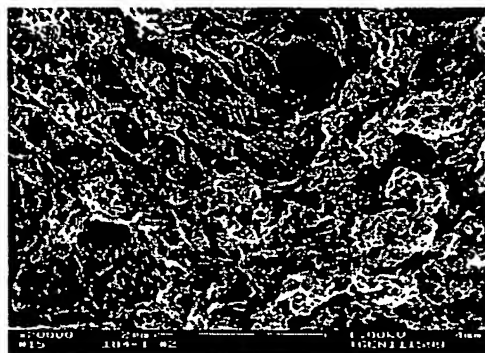
CC ink (sonicated)



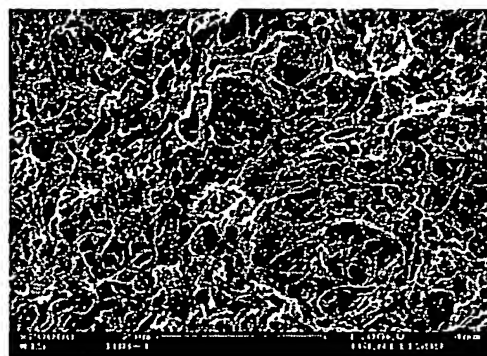
BN ink (sonicated)



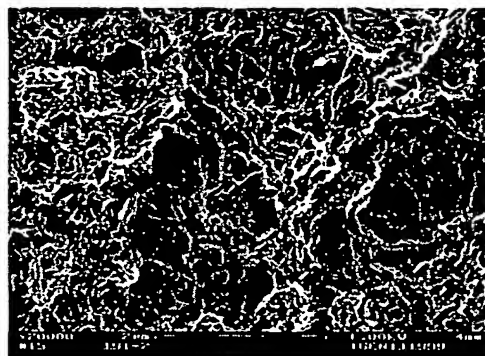
CC ink (roll-milled)



BN ink (roll-milled)



BN-CC (ox) ink



BN-CC ink

Figure 7 SEM images of fibril ink coating surface morphologies.

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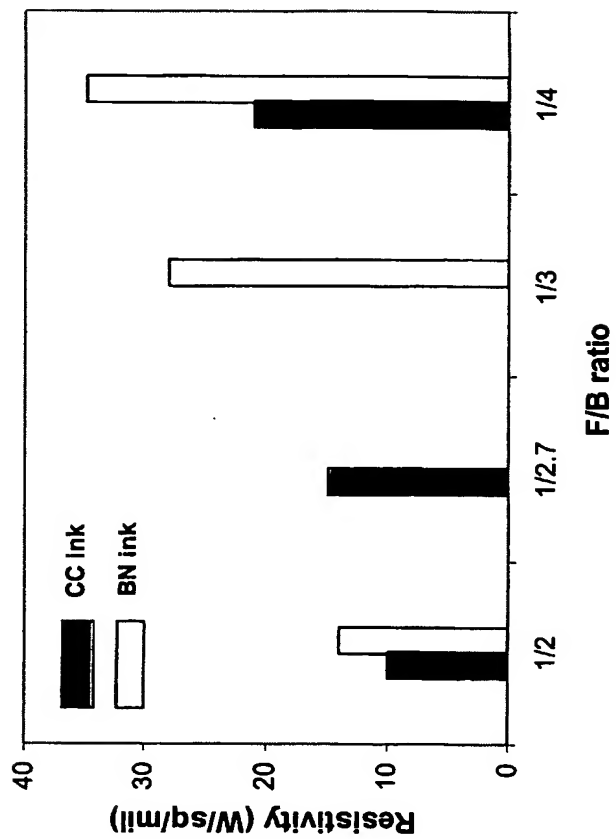


Figure 8 Coating resistivity as a function of Fibril/Binder ratio for BN and CC fibril ink.

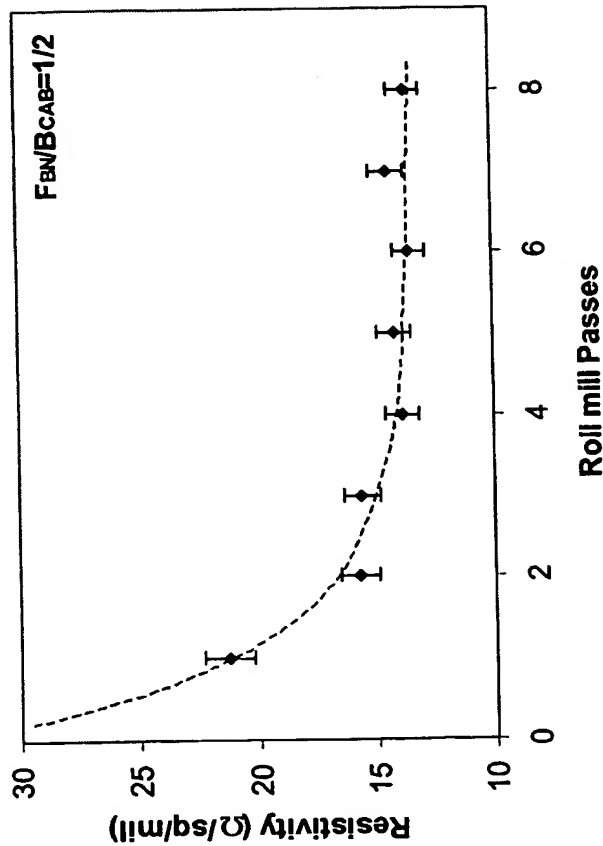


Figure 9 Change in BN ink resistivity with the increase of roll mill passes.

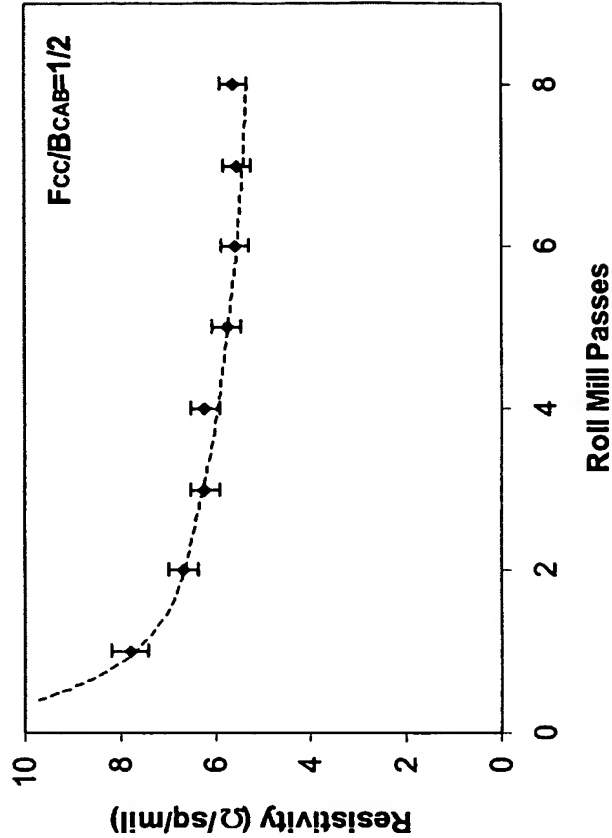
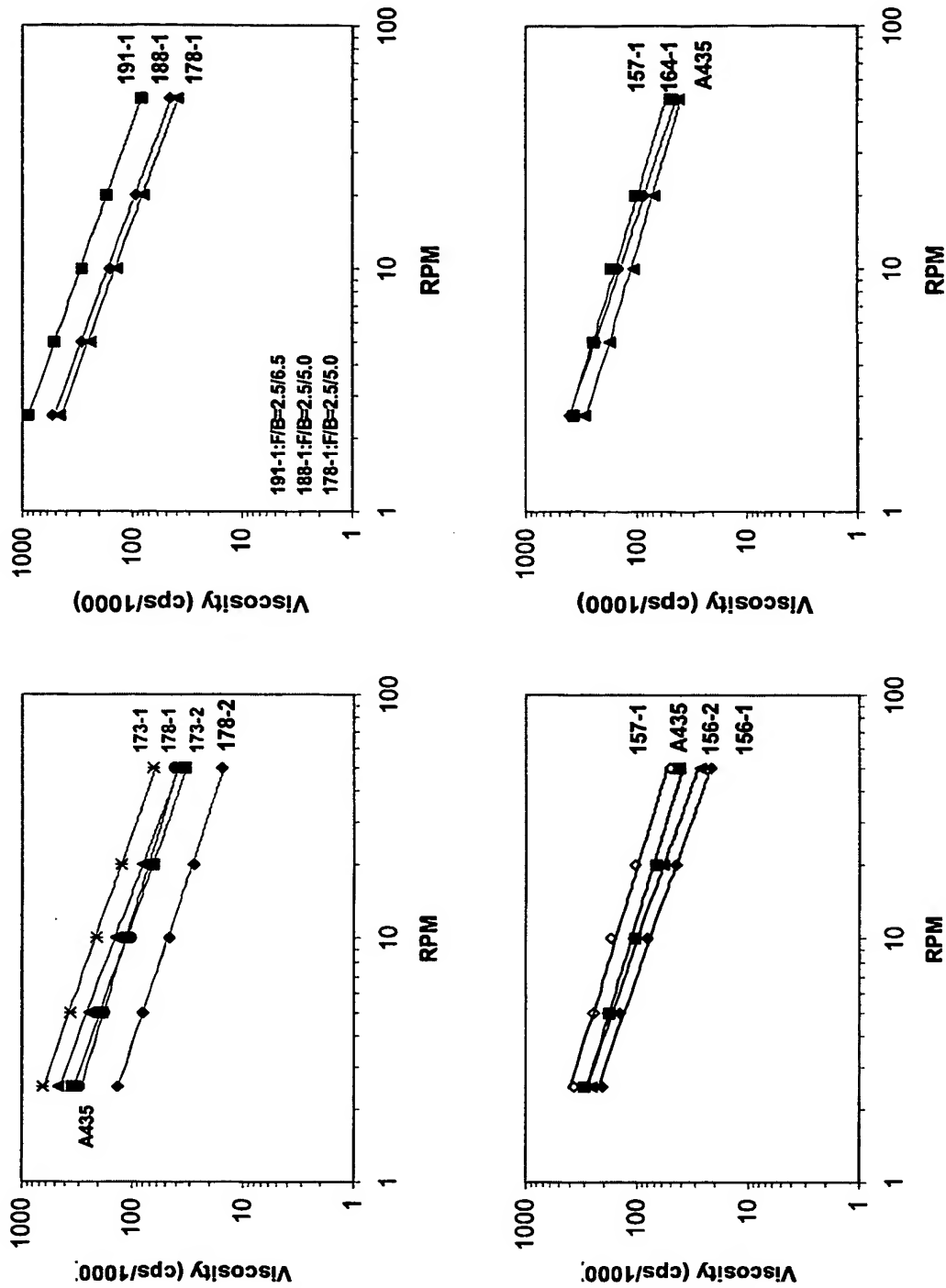


Figure 10 Change in CC ink resistivity with the increase of roll mill passes.

Figure 11 Viscosity profile of fibril inks with CAB binder vs commercially available carbon inks



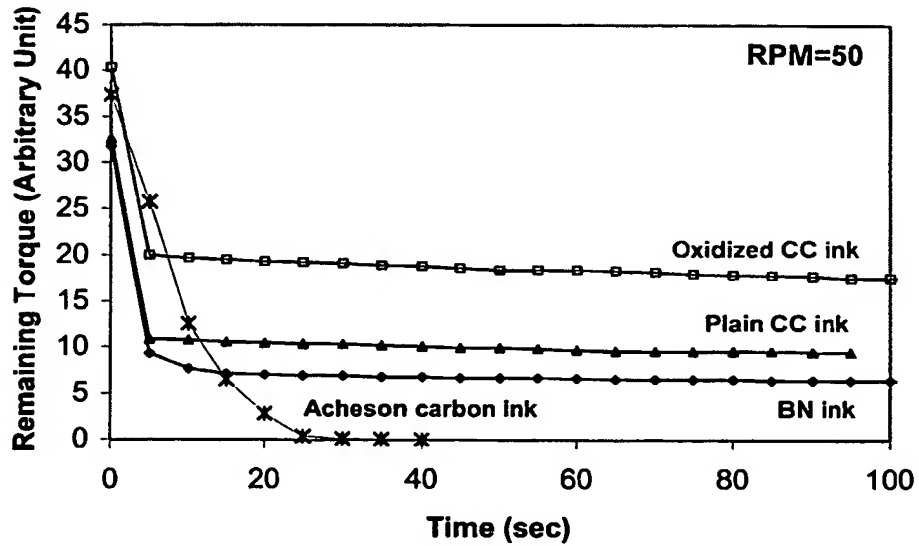
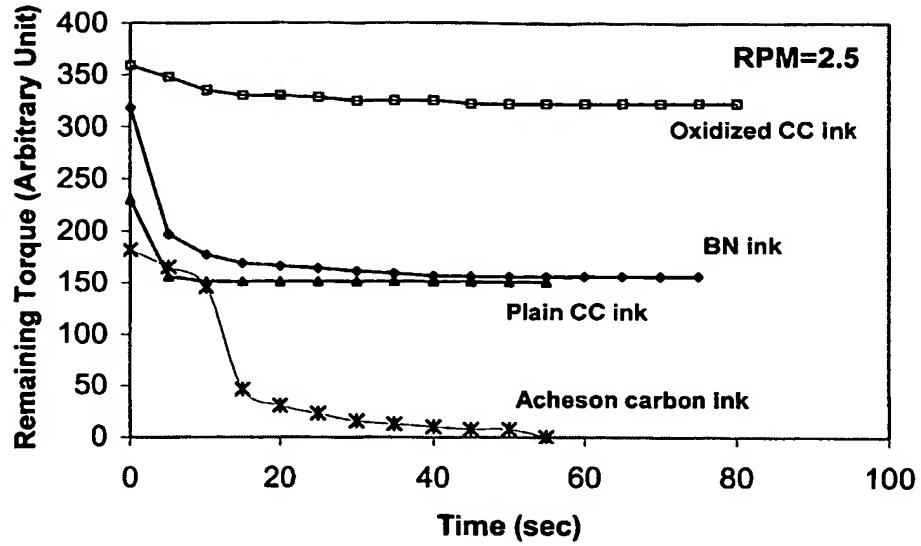


Figure 12 Changes in remaining torque after shutting down the spindle motor of Brookfield viscometer.

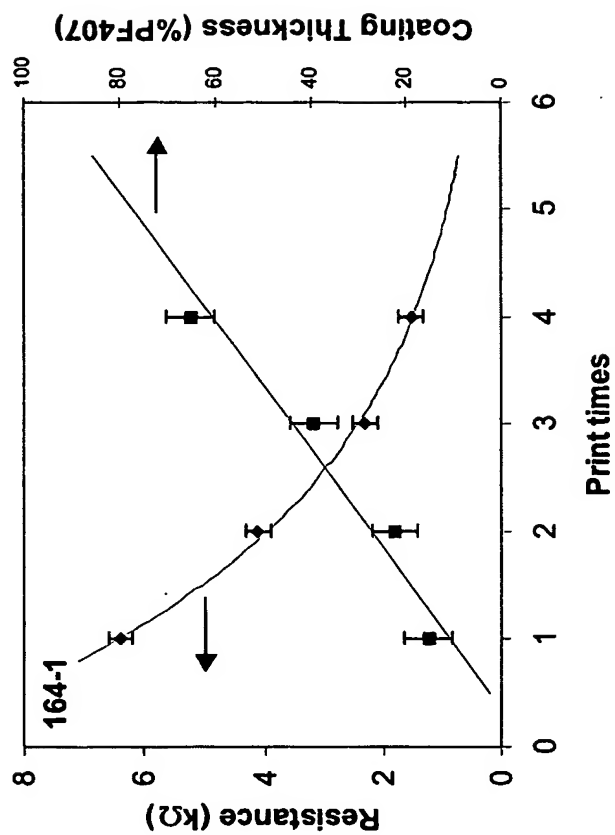


Figure 13 Relationship of screen printing passes and coating thickness for fibril ink.